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ABSTRACT

The boundaries of knowledge and performance capabilities of instructional films are extending outward, but largely in directions that are somewhat neglected in the professional literature. The use of instructional films is expanding rapidly in volume. Miniaturization of film and projection equipment has been developed, functions of films in instruction are being redefined. Theoretical foundations are emerging in promising directions. Research is advancing at a snail's pace in directions other than classical learning. Logistical organization of film supply is being decentralized, and "media man" is in a transitional stage. (Author)

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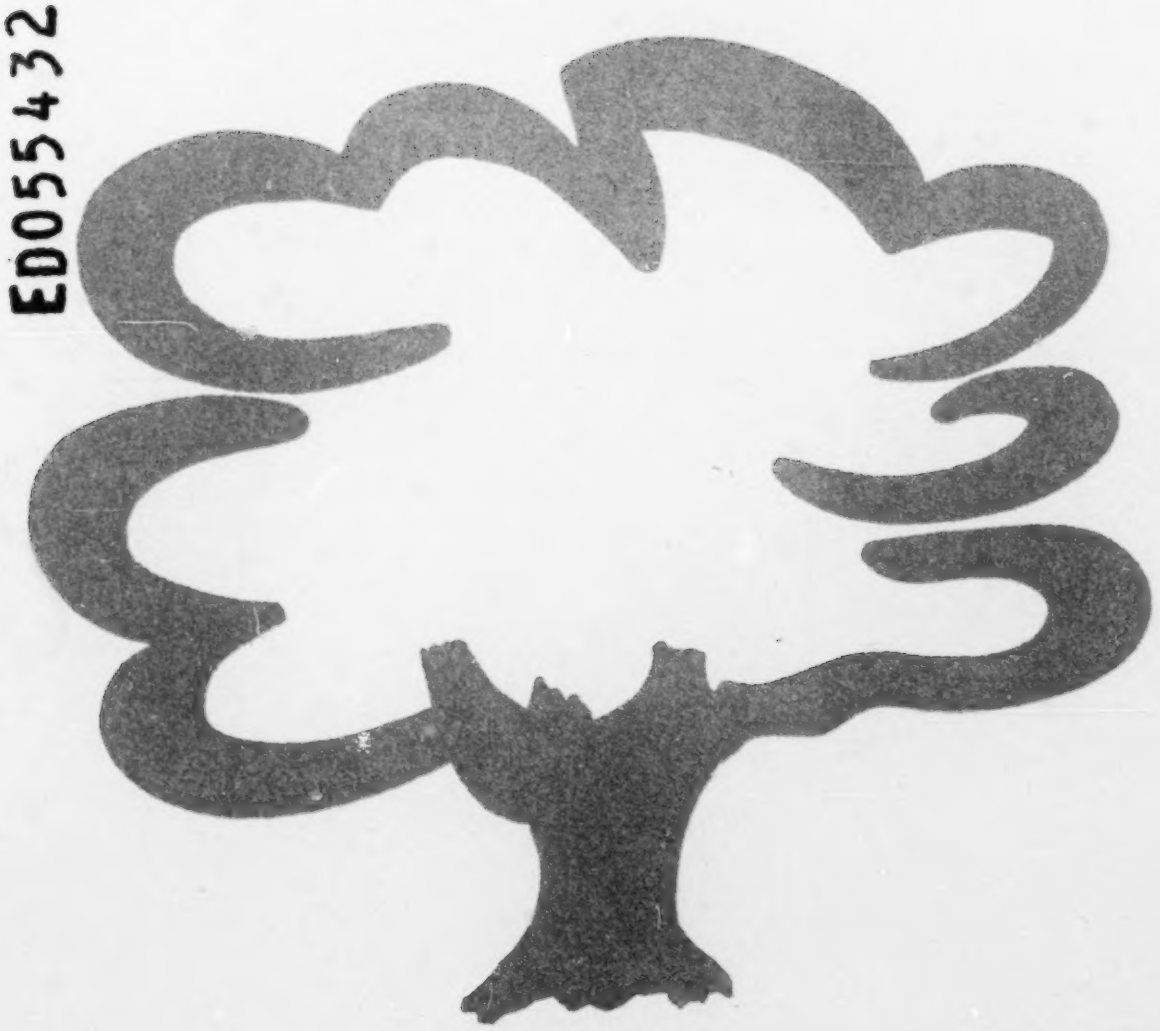

THE STATE OF THE ART

OF INSTRUCTIONAL FILMS

By Charles F. Hoban
The Annenberg School of Communications
The University of Pennsylvania

Issued by the ERIC Clearinghouse
on Media and Technology
Stanford, California 94305

In September 1971

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AUTHOR'S PREFACE

This report on the state-of-the-art of instructional films makes no pretense of exhaustive search of the scholarly or professional literature, or rigorous examination of research studies over the past decade or so, or necessary adherence to whatever conventions exist, if any, on the art of writing a state-of-the-art paper.

Instead, at some possible risk to the sponsoring agency, I have chosen to deal with the subject idiosyncratically—according to my personal estimate of what needs to be said and what is worthwhile saying at this time. It follows that my own prejudices (estimate of the situation, criteria of relevance, structure of values, attractions and aversions, etc.) enter into this report without apology or feeling of need to apologize. Many years ago I read somewhere that one should be loyal to his biases. Since then, and probably long before, I have, with occasional lapses, been accordingly loyal.

The report that follows is loosely organized. Logical, linear organization has its place, but applied to this report it would result, I believe, in overneatness and overpolish. These are not the attributes of the state-of-the-art of instructional films and, McLuhan-like, I believe the form in which the message is cast is itself *a* message—if not *the* message.

To all whose skin I may have unintentionally nicked in writing this report, I hope I did not draw blood. To all whose relevant publications I have either not read, or given the once-over lightly, or neglected entirely, I trust there will be nothing personal about the whole thing. The official and righteous reasons for selectivity in this report are time and space limitations, both largely self-imposed.

In preparing this paper I have tried to follow the general notion of a systems approach to the subject of instructional films, rather than simply to update research findings. Not all topics relevant to a systems approach have been investigated or reported in the professional literature or, if they have, I have not run across them. So rather than just trying to read about films, I asked various people questions that seemed important and received various answers. I have relied on my fellow faculty members as resources and plied them with questions, demanding answers in terms I could understand without the travail of becoming as scholarly in their fields as they were. From them, too, I have received severely firm advice on how to deal with this paper: be yourself, and tell it as you see it after 40 years of experience in the field—after all!

Since it is my firm conviction that the burden of catching and holding reader attention, interest, and critical faculties rests on the writer, I have tried to write in a conversational style, avoiding argot, but violating the short-sentence rule. People don't think or talk in short sentences, except Ross MacDonald's Lew Archer, one of the widely acclaimed characters of the contemporary American novel.

Throughout this paper, I have tried to put the subject of the state-of-the-art of instructional films in its educational, theoretical, and cultural context. In so doing, I may have created the impression of digression. If so, it is intentional. The academic world is full of insulated discussions, so narrow that the topic under discussion attains what Allport has

called functional autonomy—a sort of reification of trivia without broad social meaning or significance.

The reader may be disappointed that I have confined this paper largely to motion pictures and omitted filmstrips, which apparently are widely used in classroom teaching. Were I to include filmstrips I would also have to include 2 by 2 inch slides, then small picture sets, etc., and then this paper would either get out of hand or become too superficial.

I wish to thank Gary Peterson of the Audio Visual Center, Indiana University, for supplying summary data on audience estimates of films distributed from 1960 through 1970. Some of these data are used in the section dealing with increase in film use.

I also wish to express my deep appreciation to Terry Zaroff, who not only typed the manuscript of this paper without flaw or crevice, but also corrected my misspellings and malapropisms, and compiled the bibliography and added good sense to application of its rules of form.

C.F.H.

I. DEFINITIONS, ETCETERA

A writer or speaker should define his terms if anyone, including himself, is to have more than an imprecise or erroneous notion of what the writer or speaker is intentionally talking about.

Definitions

Instructional films signify motion pictures–sound or silent, 16 mm or 8 mm or Super 8 mm–used in instructional settings for instructional purposes. Instructional is the adjectival form of the noun instruction, and instruction signifies the intentional tutorial direction, selection, sequencing, and mediation of exposure to and enforcement of information for the purpose of shaping the behavior of others (generally referred to with some inaccuracy as students, or non-committedly as pupils).

It should be apparent from the above that instruction and education are not necessarily equated. Instruction implies *formation* of overt and covert behavior through the process of external imposition of power (control over reward and punishment). On the other hand, education is a process of *drawing* out, with decreasing degrees of external control, increasing degrees of personal freedom, and greater emphasis on direct experience and psychological discovery.

While instruction and education are not necessarily equated, neither are they necessarily mutually exclusive, antithetical, contradictory, or non-overlapping. Instruction can indeed be an important element of education.

Ask scientists or engineers what state-of-the-art means to them and you are likely to get two apparently similar definitions. One is: what we know and are able to do *now* (without more money), and the other is: the boundaries of knowledge and performance capability beyond which we cannot proceed *now* (without more money).

The difference between these two definitions is likely to be more real than apparent. The one expresses state-of-the-art in terms of available power (knowledge and performance capability) and the other in terms of constraints on power. This difference is particularly appropriate to a broad view of the state-of-the-art of instructional films, for therein lies one of its dilemmas: an overpromise of the power of films in instruction, followed by disillusion and disenchantment with the restraints that inhibit actualization of the promised power.

Disillusion and Disenchantment

When this writer began to question his colleagues about the matter at hand, the response was instant, intense, and articulate: disiliusion is widespread and is the consequence of exploitation after World War II by entrepreneurs who produced, promoted, and marketed inferior or mediocre films and unreliable, cumbersome, and difficult-to-operate projection equipment.

This exploitation was compounded by neglect of an effective support (logistical) system which would assure that both film and projector would be at the "right" place at the "right" time in operable condition, manned by a competent projectionist, such as, for instance, an apt and trained sixth-grader.

Hooper (1969) comments at length on the mediocrity of instructional films, the inefficiency of the delivery service, and the low status of the "media man." His acid assessment of the "failure" of newer instructional technology "to penetrate the American educational system" is based on a 21-month study of educational technology in this country while he was on leave-of-absence from the British Broadcasting Corporation.

Documentation of disillusion and disenchantment with the state-of-the-art of instructional films and other components of instructional technology is voluminous. The same kind of critical literature on the entire American educational system is more monumental and searing. It is a sign of a counter-culture revolution in the making, applied to education.

Media as Means to Learning: What?

To add to the confusion, we frequently hear and read that "the heart of education is the student learning" (Tickton, 1970), and the same goes for instruction, too.

Centralization of learning as the core of instruction and education has a neutralizing effect in that it carries neither denotation nor connotation of what the student learns. It states the major function of instruction and education as if the *process* of learning were its own end. In other words, a good bank robber equates with a good neighbor since the learning process was efficient for both.

Instructional films are considered as *means* and their effectiveness or ineffectiveness is considered under such abstract ends as normative increments of learning, amount and direction of attitude change, degree of acquisition of skills, and such like, without substantive regard to their moral or social desirabilities. Films are a medium and their function is to mediate, whatever that means and whatever is to be mediated.

This fate is perhaps in the nature of things as they are. One of its consequences is that in discussing the state-of-the-art of instructional films we are easily reduced to such dreary topics as miniaturization, multi-media, logistics, curriculum integration, and technical aspects of human abilities interacting with variables of film treatments, room illumination, size and brilliance of screen, etc.

From a concern with means rather than ends, other consequences follow. For example, Oettinger (1969) concluded from his study that what is wrong in the mythology of educational innovation can be remedied by better ideas and better people. Admittedly, this oversimplifies many of Oettinger's perceptive observations and conclusions, but it reflects more or less standard prescriptions for the solution of substantively undefined problems.

The national Commission on Instructional Technology institutionalized and extended this prescription by recommending the establishment of a National Institute of Instructional Technology as a constituent of a proposed National Institutes of Education. The Commission's recommended Institute presumably would, among other things, provide the therapy of better ideas and better people.

Cynicism toward the enlightening and redeeming powers of ideas, per se, and of

people, per se, and of national institutes, per se, develops as a concomitant of weariness with the cyclic experience that comes from long association with the field now known as instructional technology. The names change over time, but not the essential prescriptions, except in enormity, complexity, and bureaucratic expansion.

The Instructional Technology Tent

Instructional films, from their earliest days, were not considered in isolation from other materials of instruction. Over half a century ago they were considered as visual aids, together with glass slides, stereopticons, opaque projectors, field trips, and, later, film strips.

The advent of sound motion pictures, tape recorders, and sound film slides demanded a change in terminology, and they became audiovisual aids. With post World War II developments in instructional television, programmed instruction, computer-aided instruction, individually prescribed instruction, gaming and simulation, etc., it became obvious that a large categorical tent was required to house conceptually this wide range of materials, techniques, and procedures. The new term emerged as instructional technology. If the late James D. Finn did not invent this term, he must be given credit for popularizing and nationalizing it.

In many vital areas and among many people, however, technology has become a dirty word. The by-products of our technology threaten the air we breathe, the water we drink, the food we eat, and the world's flora and fauna. It is not unexpected, then, that instructional technology is viewed as a mixed blessing. The rich promise of programmed instruction to permit the individual pupil to proceed at his own pace was diminished by the boredom it was observed to induce, and the reported inability of some students to generalize from its rigid structuring of experience. Computer-aided instruction has been reported, in individual cases, to result in mental satiation and aversion to its impersonality, rigidity, and unyielding insistence of demand, despite glowing accounts to the contrary. Individually prescribed instruction is regarded as a misnomer in that it is individualized in rate but standardized in structure. The high-cost talking typewriter works well while it works, but its downrate is high and then machine instruction comes to a dead halt. And so on.

A major criticism of instructional technology comes from Jackson (1968a) who regards it as an intrusion of the engineering approach, with its dominant criterion of efficiency, into instruction. The current emphasis on "accountability" in education reflects the efficiency criterion, and performance contract instruction is a direct manifestation of value/cost ratio applied to instruction.

The dysfunctions and subversions variously attributed to instructional technology are much the same as those applied to instructional films—mediocrity, unreliability of equipment, inadequate logistics, etc. Basically, these are matters of efficiency. In a highly technological society, efficiency is a major requirement of competitive survival.

The efficiency criterion, however, is not the major concern of the teacher. Rather it is involving pupils in the task at hand, getting them to try hard, adhering to the time schedule, controlling traffic, and preserving order (Jackson, 1968b).

Saying What Was Said

The state-of-the-art of instructional films is bounded by a general opinion that (a) in terms of "entertainment" (holding of attention, and arousing excitation, interest, and activity) they tend to be mediocre, (b) in terms of equipment, reliability is not as high as desired, and (c) logistical support is not adequate to insure availability of films when and where films are needed.

The overall boundary of films as a medium of instruction is in part a function of a simplistic concept of the central purpose of education and instruction as learning. This reduces instruction to a process whose goals, objectives, and end-products lie beyond the concepts of medium and mediation. The a-valued boundary of mediation is compounded by a general opinion that the psychology of learning is an imprecise experimental-laboratory science, difficult to apply to the earthy practicalities of instruction in the schools and colleges (Oettinger, 1969; Jackson, 1968b). The mediation process is thus left largely to the capriciousness of habit, intuition, and individual talent.

An attitudinal boundary results from disenchantment arising from the dissonance of overpromise and underdelivery of instructional consequences of films. Magnification of this negative affective state is probably due to disenchantment with other components of instructional technology.

The reader should be aware that almost everything said so far in this state-of-the-art report is either definitional or based on expressed opinion–informed opinion, but nonetheless opinion. There are few solid quantitative studies to provide data distributions on topics discussed above. However, some of the references cited involved prolonged observational studies, and others involved people in the midst of things, who know the way it is from their own side of the fence.

II. PROMISING DEVELOPMENTS

The literature of criticism of the American educational system, instructional technology, media specialists, and instructional films is often so negatively one-sided that one might be led to believe that (a) a perfect world of education in this country lies within our grasp if only educationists, media specialists, the knowledge industry, and teachers were more creative, more highly inspired, better informed, and far more clever at their crafts, and (b) as things stand now, schools are in shambles, the curriculum is irrelevant, students and parents are in revolt, and gross inefficiency is rampant.

Without question, confidence in the American educational system is eroding. Faith in education as a religion of individual salvation, a straight and sure road to upward social mobility and the affluent life, and the more continuous years in school the better, is being shaken by doubt and outright disbelief. Rubenstein, for example, asserts that "The most important function of American higher education may be that of baby sitter. American colleges provide a relatively pleasant way of keeping unemployable young people off an increasingly difficult labor market." (1971)

The point here is not that these views are necessarily right or wrong, but that they constitute overgeneralizations, that as truths they are at best partial, and that, because of this, they obscure substantial progress and improvement in American education. For example, many graduates of many high schools have advanced so far in their academic achievements that for them the traditional freshman year of college study is repetitiously boring and wasteful. For another example, Jencks and Riesman (1969) wrote a long and discerning book called *The Academic Revolution* in which they made many controversial and critical comments on colleges and universities; yet, when sweeping recommendations were in order, they offered little more than a bleat that graduate schools should provide teacher training for their graduates.

The fact seems to be that either things may not be as bad all over as they are said in print to be, or, if they are, few critics offer bold blue-prints of better alternatives.

Things have changed and are changing with instructional films–more for the better than the worse.

Films Are Used More Widely

Despite the fact that instructional films are not prominently mentioned in such journals as *AV Communication Review, Educational Technology,* or *Audiovisual Instruction,* and not referred to at all in *Crisis in the Classroom* (Silberman, 1970), their use is increasing absolutely. For example, the audience for films owned and on deposit in the film library of Indiana University's Audio Visual Center jumped from an estimated 610,000 in 1960 to an estimated 2,141,800 in 1965, and by 1969 the estimate was 5,774,900. This estimate is based on an average audience of 100 for each booking, a constant arrived at by study of audience size per booking.

These films are not likely to be of dramatically higher quality than the "mediocre" films Hooper observed in school use (1969). They are of the same standardized size (16 mm), shown for the most part on the same old hand threaded "unreliable" 16 mm sound projectors.

No value judgment is made of increasing use of films in instruction, but the increased use is a fact of the state-of-the-art which indicates that its utilization boundaries are not constricting but expanding.

Concepts of Functions of Films in Instruction Are Changing

Consequences of unreferenced centralization of the function of education and instruction as the learning process have been pointed out, and hold as much for instructional films as for any other educational materials or procedures.

The concept of functions as consequences, intended or unintended, has on the whole not been stressed in the literature of instruction. This neglect has curiously been accelerated with the new and dogmatic insistence that instructional objectives be stated in terms of observable behavior. Among other things, specification of objectives as observable behavioral outcomes may have the effect of inhibiting the consideration of outcomes which are not easily observed, "measured," or counted, thus narrowing the spectrum both of functions and of the range of intended behavioral changes.

One looks somewhat in vain in Flory's commissioned paper on films for the national Commission on Instructional Technology (Flory, 1970) for some relief from the dearth of discussion on functions of instructional films. Instead, there is a list of attributes, some obvious and some not so obvious: motion, color, sound, flexibility, universality, accessibility, "creatability," and recent developments–such as several "stopping points," "a test for a climax instead of the traditional 'Hollywood' fade-out," etc.

With no intended disrespect for this systematic itemization of attributes, it is at best only instrumentally related to functions of films in instruction, and at worst a blue-sky vision of logistical luxury, and of an image of the affluent creative teacher (or student), camera-in-hand, recording on film the excitement of current events, laboratory experiments, and the like.

From perhaps one of the most unlikely sources, the producers of films for the curriculum developed by the Physical Sciences Study Committee, comes the view that the most important purpose of the films is to "set the tone and level of the course" (Mayer, 1961). As viewed by Mayer, "Informal, unglamorous and smack on the subject every time, the films make a fascinating hump of truth, scientific and otherwise, on the glossy simplifications of the usual school program."

These sorts of imaginative concepts of instructional films might be reducible to objectives behaviorally formulated, but at probable loss of affective meanings conveyed by metaphor. Sensitivity to moods and tones and far-reaching conceptual levels of instruction may very well be common to the informal discourse of curriculum makers, media specialists, instructional film producers, etc., but, if so, their expression in the conventional literature of instructional films has escaped me.

In more primitive terms, Hoban (1942) defined the three functions of pictures as "to show what something looks like, to show how something works (including how something is done), and to show how something happens." The function of words in films is "to tie the pictures together, explain what is not clearly evident from the pictures alone, and generalize and interpret what is shown." Hoban also noted [some 30 years ago (1942)] that "In more recent educational films there has been increasing use of dialogue, especially in those films involving children and family situations. . . . " He further noted that "In the so-called 'documentary' film, produced to dramatize some significant social situation and to develop an awareness of the condition and a willingness to do something about it, the commentary is frequently rhythmical, deliberately poetic in cadence. Music, too, is used in these and other films to create moods and to give an emotional tone to both pictures and words."

Going back to almost forgotten writing of 30 years ago, and to the title *Focus on Learning,* which reappears as the Chapter I title of the report of the Commission on Instructional Technology (Tickton, 1970), is part of the cyclic experience that leads to weariness. Perhaps *weltschmertz* might be a better word. On the other hand, spring is welcomed each year without painful reflection that seasons also are cyclical, and one can always joyfully rehearse the line from the psalm in traditional Latin: "Ad Deum qui laetificat juventutem meam."

Functions of instructional films can also be considered in terms of the established principle of fidelity of representation. By this is generally meant a geometric isomorphism between graphic representation and the person, object, event, situation, etc., represented.

While still valid, this principle may, if universalized as an imperative, contravene clearly discernible trends in American culture. If American education, and its subsumed "technology" of instruction, are out of phase with "the American Dream" as it exists today, Hooper's (1969) "Diagnosis of Failure" of instructional films and of the low status of media men is likely to reflect a widely shared opinion, right or wrong, and echo the overtones of social criticism of such previous visitors as Frances Troliope (1947 edition) and Charles Dickens (1961 edition).

Admittedly, we are on an advancing and somewhat dangerous frontier of American education if and when we begin to think of film as myth, rather than film as fidelity of representation. The fidelity of representation acts as one of the restrictive boundaries of the state-of-the-art of instructional films. Educators in general are caught in a tug-of-war between their essentially moral imperative of "doing good," and the "reality principle" (cognitive domain) of curriculum construction and implementation. Reality is sought as if it exists on a single surface level of cognitive verifiability.

Film as myth is not, as one might suppose, film as untruth, demonstrably false. In its proper sense, no myth is. It incorporates, in a variety of forms, and beneath its manifest surface, what White (1968) calls "eternal truth." Said another way, it incorporates what is believed to be true.

If we substitute "the American Dream" for "the American myth" the concept of film as myth may become more clear. The traditional American dream was land- and work-based. Green fields and forests, small farms and handcraft, self-sufficiency, cold reason, planning for the future, delayed gratification, hard work and the inevitable reward of self-proving were all part of this dream (myth).

An interim version of this dream as it is acted out in "the hidden curriculum" of the schools has been spelled out by Jackson (1968b)—stand in line, wait your turn, obey the rules, be patient, try hard, don't stir the waters, etc., etc., all of which are intended to prepare the student for entrance and accommodation to life in the corporate economy.

Shifts in values, i.e., in the essence of the American Dream or myth, are easily noticeable as emphasis is increasing among curriculum specialists on "the affective domain,"

the domain of feelings, emotions, values, self-respect, and fulfillment. Hitherto, the emphasis was indeed on overemphasis on the cognitive domain of fact, structure of knowledge, generalization, and applicability.

Basic to this shift is a reaction against science and objectivity and a turning toward subjectivity and creativity. Experience for its own sake, the value of the now as opposed to an unpredictable future, an emphasis on the bizarre in style as opposed to continuity of past, present, and future, and a growing interest in mysticism, spirituality, and non-institutionalized religion are evident trends in the new American Dream. In place of the old myths of land and work, the newer myths are those of individual consciousness and of Judeo-Christian morality taken seriously.

It is not entirely clear as of this writing what these trends imply specifically for instructional films, other than substantive and stylistic changes. It is far from clear that, as instructional film producers experiment in the direction of indicated changes in cultural values and a new American myth, their productions will be bought or used.

Furthermore, it is all well and good to conceptualize one of the functions of instructional films as that of setting the tone and level of the curriculum, but quite another to overcome inertial resistance of teachers to radical change.

Mayer (1961) comments that despite the brilliant work on the Physical Sciences Study Committee curriculum, the course was not entirely successful, "largely because its directors have thought more deeply about the text, the lab and the films than about the training of teachers to handle the course." One of the boundaries of the state-of-the-art of instructional films, as with other materials and techniques, and courses of study, is the attitudes of teachers toward innovations, their skill in dealing with them, and the persistence of established habits of thought and action. In any approach to instructional materials within an overall systems concept, the teacher is a critical component who can literally make or break the best laid plans.

Shifts in Logistical Organization

Major changes over the years in the logistical system of instructional film library service have been in the (a) decentralization of film storage, maintenance, and circulation from the large film library serving a state or region to county, municipal, or smaller organizational units closer to the users, (b) changes in function of the larger or "central" state or regional film library from that of direct service meeting "all" film needs of users to a "backup" function for the localized instructional film library or instructional materials center, and a consequent reduction of print supply of film subjects stocked by the local libraries, (c) the development of film library services by municipal and other libraries (hitherto limited to books, periodicals, reference works, etc.) to meet the needs of various groups engaged in informal education rather than in direct, "classroom" instruction.

A related shift came with the development of what are referred to by film librarians, directors of instructional materials centers, etc., as "Christmas films." This holiday term is a generic one and refers to films which are used only during a limited seasonal basis. Films produced for use in curricula prepared by various national or university study groups in the physical, biological sciences, etc., fall in this class. Their use is time sequenced, the supply of prints on any given topic in the course series must be adequate to the seasonal demand. As a consequence of time phasing of topical film use, prints can lie idle for most of the year, and the criterion of maximum print recirculation, which was previously considered desirable if not essential to efficient and economical film library operation, required and received modification.

The above changes did not occur yesterday. They go back some years. Note is made of them here solely for the purpose of indicating that film library service is not frozen in overall organization, functions, or rules of operation.

Miniaturization and its Consequences

One of the outcomes of the military during World War II and the Korean War was the miniaturization of communications equipment. This trend has continued in instructional films with the development of 8 mm and Super 8 mm films and projectors, including small lightweight rear-projection screens (Forsdale, 1970). Along with this miniaturization came the brief single concept film, or film loop (Wagner, 1970).

Projection equipment was also improved by provision for automatic threading, which eliminates the hand-torturing process of adjusting sprocket holes to sprockets, and which should reduce film damage. A highly reflective screen has also been developed which reduces problems of light control.

Developments in miniaturization have had a series of consequences on film function, film use, and the integration of films into teaching procedures.

From their earliest days, motion pictures have been regarded as a "mass medium," i.e., to be shown to large audiences, somewhat heterogeneous, with little interpersonal interaction, and with no readily available means of concerted, unified social action. On the whole, and within limits known to all classroom teachers and observers, instructional films have been used in classrooms and auditoriums in consonance with the "mass medium" concept.

One of the unrecorded but interesting by-products of this "mass medium" concept was observed too many years ago to be mentioned accurately. In an urban high school, where the social composition and drop-out rate were roughly the same as that presently attracting overdue attention, one of the teachers conceived the idea of a once-a-week noon-day showing of films in the auditorium on topics of educational significance. It was noted, but not recorded in the professional literature, that many chronic truants and potential dropouts regularly arrived at noon for the film showings, stayed throughout these programs, and then left the school building promptly thereafter.

Important here in a curriculum otherwise regarded as irrelevant, joyless, and aversive was the fact that "the image" (Wagner, 1970) was attractive, that it had drawing power that the routine curriculum of the classroom lacked, and that it attracted and held in school for the time being a segment of the student body otherwise repelled by the conventional curriculum and classroom teaching procedures.

Anyone who has taught a course in educational communication and technology to bright college seniors and graduate students, who has had the courage of conviction to turn the work of the course over to the students, and who has assigned topics to be investigated by them without structuring a list of topics, or a method of investigation, and who has insisted on oral reports rather than term papers—anyone who has done this soon learns that many younger people have a strong belief in what they call "the power of the tube," meaning television. Without arguing this point, it is conceivable that the power is in what Wagner (1970) refers to as the image—the picture with sound, including the motion picture.

Essentially, the point under discussion is that instructional films have in the past and will likely continue in the future to be a "mass medium," a medium of (large) group instruction.

Miniaturization of both film and projection equipment have the effect of adding small group and individualized instructional use to that of large group instruction.

For one thing, the sheer clumsiness of the standard 16 mm projector, plus reel of film and takeup reel, plus screen, has been greatly reduced. Size and weight reduction of projector and screen facilitate film use with small groups, and their incorporation into individualized instructional programs, whether with or without carrel. The film loop, cassette, and single concept film lend themselves to incorporation into a multimedia usage in the teaching process, and greatly increase the possibilities of programmed instruction which, hitherto, has been largely limited to verbal "frames." Indeed, instructional film

miniaturization could be a major factor in loosening the rules of programmed instruction construction so as to make them more flexible, inclusive of several media, and thus richer in variety of stimulus sources and less boring by virtue of variety of media, if for no other reason. This applies equally to individually prescribed instruction.

An important distinction has been made by Jackson between individualizing and personalizing instruction (1968a). The seminar, properly conducted, combines both. The one-room school, impoverished as it may be in physical facilities and instructional resources, also combines both. The point is that elaborately constructed learning resources centers are not the essence of individualized and/or personalized instruction, that dial-access systems are expensive and not entirely reliable, and that complex and expensive facilities such as these may remain much too idle, in part because they are architecturally, electronically, and conceptually overengineered.

Computerized Film Production

One of the most recent advances in the state-of-the-art of instructional films is computer programming of complex animation of wave phenomena, etc., which otherwise would take years of man-hours to animate manually, if in fact manual operation could ever achieve the required precision.

While computerized programming of film production was developed over the past several years in the private sector of the electronics industry, one of the most elaborate and fascinating animated films was produced within the past few years by the University of Pennsylvania's Moore School of Electrical Engineering. Apart from instructional significance of the phenomena visualized, which lay beyond the ken of this writer, the sheer choreography of color lines in motion in this film was so aesthetically exciting as to raise the question of whether a "new dimension" of instructional films had not been created by computerization of film production.

III. SIGNIFICANT THEORETICAL DEVELOPMENTS

In the area of theories significantly related to instructional films, four developments are especially worth noting, some of which are in the common knowledge of media men, curriculum makers, etc., and some of which should be but possibly are not. In order of discussion below are Marshall McLuhan's theory of media-borne messages (1964), cultural film theory developed by Worth and Adair (1970), single and multiple transmission theory as represented on the one hand by Birdwhistell (1970) and on the other by Hsia (1971), and expectancy theory as explored and explicated by Rosenthal (1971).

McLuhan: The Medium is the Message

In the year or so following passage of the National Defense Education Act of 1958, a tall Canadian professor of English named H. Marshall McLuhan applied for and received a grant from the U.S. Office of Education to explore ramifications of his theory that all media have the power to impose their assumptions on the unwary. The ultimate outcome of this project was *Understanding Media,* first issued as a mimeographed report of the research study (1960), later thoroughly revised and expanded on a grander scale and published by McGraw-Hill in what at the time was regarded by many as a publisher's folly (1964).

Subsequently *Understanding Media* was issued in paperback and may be found in the more respectable sections of almost any retail paperback outlet in the country. Two prior books, *The Mechanical Bride* (1951) and *Gutenberg Galaxy* (1962), have also been reprinted in paperback, and new books by McLuhan on culture, technology, and communication continue to roll off the presses. A steady stream of articles and books by others–some explaining, some praising, and some faintly or vigorously damning McLuhan–has followed. They have been ignored with tranquility by McLuhan, who seldom bothers to rebut his critics.

Welcome or not, the Age of McLuhan has arrived in communication theory and hence, in the areas of instructional films, ITV, PI, IPI, etc. A sort of widely shared wishful belief exists that McLuhan and his theories are the analog of a meteor entering the atmosphere–a bright light flashing across the skies only to burn itself out and disappear. Because his writings are difficult to understand, because the reader must, as Gutenberg (print-formed) Man, derive the propositions that McLuhan boldly asserts, because he is thought to be a technological determinist which he is not (the media can impose their assumptions *on the unwary*), because he avoids proclamations on values (which he holds but refrains from discussing until processes are better understood)–for these and other reasons it is much easier to wish that McLuhan would simply go away than to work through to understanding McLuhan. It is also much easier to do than to offer alternative concepts and explanations.

In discussing the relevance of McLuhan's theories to instructional films it is appropriate to recall the previous discussion of functions as consequences. One of

McLuhan's basic propositions is that media per se carry their own messages, that these media-borne messages have consequences in patterning our modes of thought and expectation, our actions and reactions, our involvement and detachment.

If this thesis has any validity–and some of it goes back to Plato's argument in favor of the rationality of prose vs. the emotionality and immorality of epic poetry, its harp accompaniment, and the nature of audience participation in the recital, and to Greek theater itself (Havelock, 1963)–then its consideration and its implications belong on the agenda of any relevant and sufficient theory of instruction.

McLuhan's case for the psychically formative results of the medium of print is most convincing (especially to the writer of this report) of all his media constructs. It can be derived from the Greek alphabet which was capable of representing visually all sounds of the spoken language. The *uniformity* of the visual letter representation, the *linear sequencing* of letters into words, words into sentences, and sentences into paragraphs, were all part of the structure of writing with the Greek alphabet. Printing added reproducibility and *regularity* to the process, permitted wide distribution, and expanded the demand for literacy in the population. According to McLuhan, post-Gutenberg man acquired from the medium of print the psychic characteristics noted above. In addition, since print carried no meaning in itself, post-Gutenberg man acquired a posture of *detachment* and the *ability to act without reacting* (both of which are the opposite of involvement).

Motion pictures, on the other hand, are more iconic than symbolic, if symbols are somewhat narrowly defined as non-isomorphic representations, as, for instance, the letters of the alphabet. The systematic study of signs and symbols is being pursued on many fronts. It appears to be the prudent thing to avoid discussion of semiotics in this state-of-the-art paper, except in references to McLuhan, Birdwhistell, and color as a medium, to follow.

Within McLuhan's theories, film is a "hot" medium, i.e., the screen image is so full of information (filled with patterned light in color or shades of gray) that little burden is placed on the viewer to fill in missing information, to be co-producer of the film. Without arguing the premise, it follows that film is more an objective than a subjective medium, that the role of the viewer is that of a witness rather than of a participant, that the viewer "takes in" from a film instead of "filling in" or helping to create the film.

Within this interpretation, one can begin to get a plausible handle for the label of mediocrity attached to instructional films, the description of the PSSC films as a "hump of truth," and the resort to questions inserted in instructional films to elicit pupil participation.

All these may possibly be a function of the nature of the film medium as it is said to be by McLuhan. If films are information-filled, it follows by definition that they lend themselves easily to "factual" (objective, verifiable) presentation. In turn, films are easily insinuated into the didacticism of school instruction, and may tend to intensify the school's didactic format. If instructional films are mediocre, they are so to the degree that didacticism is mediocre.

It also follows that film as a medium lends itself easily to the single concept loop film. The single concept is objectively "out there," to be taken in without transformation (creative modification). "Taking in" may and often does require repeated exposure–recycling the loop.

In the same way, the "hump of truth" is "out there," too, assuming that "truth" can be and is absolute, external, and eternal, while admitting that man's grasp of it is imperfect and changing.

The insertion of questions in a film to elicit student participation is a didactic intrusion into the film medium of a verbal "quiz." It is something of a last resort to add to the medium of film the property that the medium per se tends to exclude–participation in its making, in the "story" it tells, in the continuity of its pictorial structure. Observed

improvement in "learning" from student participation in answering inserted questions in a film, while desirable from an instructional point of view, may also be an indication of either the teaching inferiority of the film per se or of the limitations of "measures" of "learning" applied to instruction by film. Admittedly, this criticism is medium oriented, but it is also intended as a criticism of the question-answer pedagogy of the classroom. It also reflects the writer's aversion to the Socratic method, even at the hands of experts, who, in general, are in short supply.

Also, from McLuhan's construct of film as an information-filled medium, one can more readily understand some of the difficulties encountered in teacher resistance to the "open-ended" (Hoban, 1946) film. Lack of closure is lack of "complete" information. The effect of the "open-ended" film is like the dropping of one shoe—the act is left incomplete, demanding closure. When such information is not supplied by the film—when the film as a medium deliberately violates its own internal property—then the missing information must be found elsewhere, by speculation, supposition, or continuing inquiry into reliable sources. The bell may ring to bring temporary respite, but the problem remains, and involvement (participation in the hunt for information) is required.

Film libraries report that when the "new" (open-ended) films are produced, catalogued, and racked for circulation, many teachers will not use them—for probable reasons which may be deduced from McLuhan.

TV, or in this case ITV, has the opposite property. It is a "cool" medium which requires audience (student) participation of a sort. It is not the business of this state-of-the-art paper to examine ITV, but the question can legitimately be raised as to what change in medium properties occurs when films are shown on television, as they frequently are. Logically, the answer seems obvious, but it has not been empirically answered convincingly.

Serious consideration of McLuhan's theories of media opens up new or newly formulated areas of inquiry in intermedia comparisons in instruction. Because of prior inadequacy of media theory, many relevant questions have not been raised or examined at all, or, if so, with more or less sterile conceptualization of independent and dependent variables.

Films as Cultural Reflectors

That films reflect the culture of the society or cult of their makers is generally regarded as axiomatic. So is the corollary that American instructional films follow the "rules" of the subculture of American school instruction. Beyond these two statements, it is difficult to proceed, since very little analysis has been made of instructional films in terms of the values they portray and the "rules" under which they are produced and used.

As with other aspects of our culture, the above matters are more or less taken for granted. Since schools in general, and instruction in particular, are under attack it is to be expected that instructional films also be under attack. As previously indicated, they are. To an extent, instructional films are lower as cinematic art and as instructional materials than they could be, but the problem here is "why?" Some clues were sought above in attributes of the medium of film traceable to McLuhan's theories. Here we are concerned with films as reflectors of the culture of their producers (and users).

The axiom that films reflect the culture of their producers was explored by Worth and Adair (1970) in their research on teaching "native" Navajo teenagers to make motion pictures on any subject of their choosing and in any manner of camera work and editing they chose. Among the several reasons for selecting Navajo teenagers, and the particular Navajo settlement selected, was that Navajo culture differed from that of other ethnic groups in this country, and the people of the village had seen few motion pictures and thus had not learned the rules of American filmmaking.

In a broad sense, Worth and Adair did not entirely discount the Whorfian hypothesis of language determined perception and conception of one's world. Rather, they were interested in it to the degree that film may be a "language" (code of communication). Thus, films produced by "native" Navajos would be relatively unique, among other things, in "syntactical organization and sequencing of events and units of eventing. . . ."

In a preliminary report, Worth and Adair (1970) revealed that the "native" Navajo neo-filmmakers did indeed follow different rules of editing and sequencing, of selection of actors and locales, and, as was expected from the Whorfian hypothesis and study by other anthropologists of Navajo culture, in the use of motion, both of the camera itself and of the "content" of the films (preoccupation with walking).

One of the most striking (tentative) findings of this study by Worth and Adair of the "native" Navajo filmmaking was that "we seem to have some evidence that the *rules of Navajo myth and storytelling* are more relevant to how events like weaving a rug, making silver jewelry, or building a shallow well are shown than to the 'real' events that take place when these activities are actually performed."

If this tentative finding is borne out in more extensive study of the problem, and if the dominance of myth and storytelling over the "real" events is extended on a cross-cultural basis, then we may have some new ways of looking at and analyzing films produced for instructional use, and the manner of their use in instructional situations.

As with the discussion of the relation of McLuhanism to instructional films, the conceptual boundaries on the state-of-the-art of instructional films have been extended outward by Worth and Adair, whose full report of their work is now in press under the title, *Structuring Reality: The Navajo Make Movies.*

One of the changes that hoped-for future monitors of the state-of-the-art of instructional films can be alerted to is film depiction of the changing values in American culture previously alluded to, and of the emergence, if any, of new myths for Americans to live by.

Theoretical developments being advanced so far in this state-of-the-art paper were strongly reinforced by Birdwhistell, who commented in a paper on teaching aids at a symposium on the teaching of anthropology that "It has been my experience that one of the greatest handicaps to the systematic use of teaching aids is the inclination on the part of the teacher to think of a piece of equipment and then to plan possible uses of it. One should, rather, examine the problems in teaching and research and then search for methods for their solution" (1960).

In this same paper, Birdwhistell also discussed in lucid and practical terms some of the problems of using teaching aids and some of the things that can be done to reduce their severity, if not completely eliminate them.

Single and Multiple Channel Transmission

The problem of single and multiple channel transmission of information is one of the most basic in the area of communication and of particular significance to the use of sound motion pictures, sound film strips, and instructional television.

At this point in time, the problem has two aspects: multimodal transmission of information by the source, and single or multiple channel transmission in the nervous system of the receiver. This problem was brought to the attention of media men by Travers in a lead article in *AV Communication Review* (1964). Travers pointed out that while assumptions on simultaneous visual and auditory transmission and on the effectiveness of realism of presentation were both popular and plausible, they did not fit theoretical models of perception and information transmission developed by psychologists, nor theoretical conceptions emerging from physiology. The problem is complicated by short-term and

long-term memory, and by varying channel capacities of the sensory modalities.

What everybody—well, almost everybody—agrees on is that the amount of information impinging on the human sensorium at any moment is enormous and that an enormous gap exists between "real world" information and the capacities of the sense modalities to process this available information.

Hsia summarized research on information processing capacity of modality and channel performance and found that many questions were unanswered (1971), but that "Regardless of which modality or modalities are to be used, stimulus information seems to go through a multistage conversion before it can reach short-term memory or long-term memory or both." He concludes from his review of the literature that basic problems of stimulus encoding processes, retrieval from long- and short-term memory, stimulus and between-channel redundancy, etc., "seem to move the AV communication studies more and more into the neurophysiological realm."

Be that as it may, and it does not appear improbable, the fact remains, or appears to remain, that training has a great deal to do with both sensitivity to and ability to select and organize "real world" multimodal information.

Birdwhistell has contended that communication is multi-channel (1970). This contention is basic to his long study of body language (kinesics), i.e., messages signalled through body movement and posture in situational contexts. Whereas Hsia was concerned in his summary of the literature with human capacity to *receive and process* information, Birdwhistell is concerned with patterned information transmitted among individuals, and to an equal extent with training people to become sensitive to "minimal cues," to select among them, and to interpret them.

In gross terms, we are all familiar with the bent-over figure of the man or woman weary and heavy burdened with inescapable troubles—or the quick frown, the distant stare, the raised eyebrow, the clenched fist, the tight lips, the eyes that smile, the red face, the blanched face, the handshake that crushes your knuckles, or feels like a dead fish in your palm. These are obvious body messages, but each is socially meaningful only in context. The red face may express embarrassment or anger, the pale face fear or rage—or anemia, or utter exhaustion. Thus, Birdwhistell appropriately titles his latest book *Kinesics and Context* (1970).

Basically, Birdwhistell's field is body language in its most subtle and meaningful signalling significance. One of his key concepts is what he calls "minimal cues"—the signals transmitted in the unobtrusive and consequently frequently unnoticed changes in facial expression, scalp movement, foot movement, voice intonation and inflection, silences, etc. These minimal cues may vary from those difficult to observe because of their extremely short time span, through the observable but normally unobserved such as the slightly raised eyebrow in "normal" speech, to the readily observable which is unobserved because of idiosyncratic insensitivity of the individual.

Unlike those who produced the literature summarized by Hsia (1971), Birdwhistell assumes that the organization of the vast human system of information processing is learned. "The structuring of the central organizational system is, at minimum, as varied as are the cultures which govern the social order of interpersonal activity. The organizational structure is learned" (1964). One does not attend only to lexical expression but to other interdependent sensory expression as well. "[Man] is a multi-modal and continuous communicator" (1964). "To say it simply, any observation which attends only to the words spoken . . . must by definition contain not just partial but erroneous data. Not only can words not stand alone . . . but also, when observed discretely, they lack all the significant messages carried by the full system . . . " (1964). Here, Birdwhistell was writing about psychiatric interviews and records. The writer of this paper has taken the risk of generalizing his statements beyond the intimate psychiatric interview to the broad field of communication.

In so doing, we are dealing with what has popularly become known as "visual literacy," i.e., one of the interdependent elements of "learning from films." Birdwhistell provides a broader theoretical context and painstaking methodology for a discerning study of "visual literacy" (1970).

While doctrine in the area of single and multiple channel information processing remains unsettled, or at least not satisfactorily clarified among psychologists and physiologists, it appears to be somewhat unarguable that, with individuals and in sound films, multi-channel signalling is a fact of life.

In a real sense, research in instructional films is beginning to have its work cut out, and the road ahead is neither slick nor dull.

Obviously, the boundaries of knowledge which underlie the state-of-the-art of instructional films are being blurred by the emergence of the new science of kinesics and by those scientists who are prying into the physiological and psychological processes of human information handling.

Teacher Expectation and Pupil Performance

Consistent with the communication approach of Birdwhistell (1970) and, particularly, with his emphasis on "minimal cues," is the concept of teacher expectation as it acts as a self-fulfilling prophecy of pupil performance. Expectancy as a factor in influencing behavior has been most fully developed in the literature by Rosenthal (1966, 1968, 1971). His work best known among educators is probably *Pygmalion in the Classroom,* written in collaboration with Jacobson (1968). This book has stirred the waters among the professors, provoking reviews in professional journals ranging from high praise for the hope it offers, to a critical meanness, pettiness, and brashness which borders on hysteria. Essentially, it was reported in *Pygmalion* that children whose teachers were led (falsely) to believe that they showed promise as potential "bloomers" showed increases over time in IQ scores. The findings actually reported were more specific, varied, and complex than indicated above, but the above statement indicates the general idea which was so disturbing to the professional establishment.

Teacher expectation as a factor in pupil performance is more or less simply a specific application of "a principle that holds that often in the course of interpersonal relationships, one person's expectation for the behavior of another person can come to be a significant determinant of that other's behavior" (Rosenthal, 1971).

In dealing with the instructional implications of expectation theory and research results, Rosenthal comes down to the labels of advantaged and disadvantaged children and the consequences of these labels on pupil performance. "There are no experiments," he says, "to show that a change in pupils' skin color will lead to improved intellectual performance. There are, however, the experiments described in this paper to show that change in teacher expectation can lead to improved intellectual performance and related behavior" (1971).

While the research reported by Rosenthal (1966, 1968, 1971), like that of Birdwhistell (1970) deals primarily with interpersonal communication, there is some evidence that it applies to media. For example, audio tape recorded experimenter directions to subjects (without the presence of the experimenter), under different experimenter expectation conditions, yielded predicted results in the direction of experimenter expectation. This suggests that the sound track of (narrated) instructional films which include expectancy cues could possibly affect pupil performance.

From the literature on experimental research on expectation, the following general propositions can be advanced tentatively:

1) Expectation cues can be multi- or single-channeled (visual, auditory, or both).

2) Successful unintentional influencers manifest the attributes of tact, an air of dominance, attention to the business at hand, and a facility for motor discharge (body expression).

3) Other attributes of successful expectancy influencers are higher status in the eyes of their subjects, more professional and more competent professional manner, being more likeable in the eyes of their subjects, being more relaxed particularly in movement patterns, and avoiding an overly personal tone of voice that might interfere with the business at hand.

4) Greater benefits of favorable teacher expectations accrue to those children most accurate in judging the emotional tone expressed in the teacher's voice.

5) Teacher expectation about a pupil's performance may sometimes be translated not into subtle vocal nuances or general increases in positively toned attention but rather into overt and even dramatic alterations in teaching style.

* * *

Almost all the above tentative statements are taken either verbatim or with only minor change from Rosenthal (1971). They are based on the research of many investigators.

It is interesting to note that favorable results from the ITV program "Sesame Street" were preceded by a favorable expectation on the part of its producers, and it is even more interesting to note that high as these expectations may have been, they were in some areas below the level of potential achievement of their intended audience (Ball & Bogatz, 1970).

The lesson here is that, as has been implied by others, we may with possible profit take our eyes away from the films from time to time and turn them on the teachers using the films and the producers who make them for instruction.

IV. INSIGHTS FROM RESEARCH

Extensions of the boundaries of the state-of-the-art of instructional films are evident in varying degrees of clarity from theories discussed above, all of which have been either developed or deepened during the first dozen years, give or take a few.

Research on instructional films has lagged behind theory development, and what research has been done during the last decade or so has often been more complex than insightful or definitive. As Allen (1971) has pointed out, the "Golden Age" of film research was that done during and following World War II, much of which was included in the instructional film research summary by Hoban and van Ormer (1950). The newer technologies of ITV, PI, IPI, and CAI, because they are new and—with the exception of ITV—of a different conceptual structure and function than that of films, appear to have attracted the attention of some of the best available researchers.

In reviewing the readily available research of the past several years, selection for inclusion here has been made more on the criterion of significant insight in problem formulation than on rigor of research strategy. A reaction has set in against what some believe to be excessive emphasis on rigor, largely because the requirements of rigor impose restraints on research design. Along the same line, a library of computer programs is a mixed blessing—too frequently these programs determine what data are to be gathered, in what form, so as to fit the programs, and researchers rush to the computer center with their punched cards but without sufficient understanding of the processes performed on the data and, therefore, of the meaning of the processed printout.

Ideally, a good research study combines significant insight in problem formulation with rigor of research design, but even in this ideal case any single behavioral research study taken by itself is little more than an anecdote. Confidence in research findings comes from replications of the studies, not from the p values of a single study. Distinctions between validity, reliability, and precision (generalizability) are not as clear-cut as formerly. There is reason to regard validity as an adequate criterion of confidence when validity is defined as congruity of findings on a given problem, of research studies independently conducted by different investigators, in different places, with different populations of subjects.

With this caveat in mind, let us look at what research has contributed to the boundaries of knowledge on the conditions of interaction of films and audiences.

Available Summary of Knowledge from Research

One of the best, if not the best, statements on principles which have emerged from research on instructional films is that of McKeachie (1967):

1) Students can learn from films, and usually do learn at least as much as from a poor teacher (VanderMeer, 1950).

2) Such learning is not confined to details, but may include concepts and attitudes (Hoban and van Ormer, 1950; Kishler, 1950; Mertens, 1951).

3) Outline materials such as titles and commentary increase learning if a film is not well organized (Northrop, 1952).

4) For less intelligent students, repeating the film increases learning (McTavish, 1949).

5) Students learn how to learn from films; i.e., students with previous experience with instructional films learn more than students without previous experience (VanderMeer, 1951).

6) Presenting pictures is more effective than presenting words as stimuli in rote association tasks such as learning a foreign language (Kopstein and Roshal, 1954; May and Lumsdaine, 1958).

7) Participation increases learning (Hovland, Lumsdaine, and Sheffield, 1949). In this study, active response with prompting and feedback was most effective on the most difficult material with the least motivated, least able students–a finding which probably has wide generality in teaching (see also Michael and Maccoby, 1953, 1961). However, Ash and Carlton (1951) found that note taking during a film was not effective when a test was administered immediately after the film. This suggests that active participation needs to be planned in the production of a film or television presentation, rather than being interjected as an additional task for the student.

It is to be noted that none of the studies cited by McKeachie was published later than 1961, five years before the original edition in which McKeachie's chapter was published. Most of the studies on which he bases his principles were published prior to 1960–in other words, during the Golden Age of film research.

In proceeding beyond McKeachie's seven principles it is necessary occasionally to reach out to research on television for insights which *may* be applicable to instructional films, risking possibly significant differences attributable to the medium of television ("cool") as contrasted with that of films ("hot"). Also, as previously, the criterion of significant insight will be invoked from time to time, especially in the case of exploratory studies.

The relatively few research studies discussed below were selected from roughly 200 plus, which were scanned for significant insight. Only those were included which appear to advance the frontier of knowledge in more or less "off-beat" ways, i.e., outside the normal, conventional, beloved topics of educational psychologists and media researchers. If any of the included studies deal with "learning" outcomes, it is simply coincidental or accidental. We know that pupils "learn" from instructional films, and we know something about the kinds of "learning" facilitated by films, and we know some of the factors that facilitate "learning" responses. Omission of scores and scores of research reports on topics of this sort from the following discussion casts no reflection on their conventional significance or on the rigor of their design; it simply represents the implementation of a conviction of this writer that important advances in knowledge about instructional films are most likely to be found not on the well-travelled throughways, but along the more unbeaten paths of instructional concerns.

Institutional Context, Verity, and Perception

The influence of institutional situational context on what is observed, what is accepted as "true," and on attitudes toward the subject was investigated by McCormack (1962) in an exploratory study of reactions to a sound film strip on Eskimos building an igloo, shown over television and viewed (a) in school, (b) at home, and (c) in school and at home. To these three viewing groups was added a fourth which did not see the program at all. All four groups (total N = 464) were matched for sex, socioeconomic status, and school achievement ratings. All four groups were from grades two and three in 13 different schools in metropolitan Toronto, Canada. The day after the program was shown, all 464 subjects were interviewed. Some of the information obtained in the interviews was volunteered and some consisted of responses to direct questions. All the information from the interviews was coded. Several of McCormack's findings are of interest.

She noted, for example, that children can expect school programs to be true, while their expectations of home-viewed programs vary a great deal. Exploration of what children regarded as true or make-believe indicated that the children do not make this distinction clearly. Programs with realistic detail are apt to be regarded as true, whereas cartoons and slapstick are regarded as make-believe. Children who did not see the experimental program provided information on context by stating, in effect, that if it were shown in school it must be true and that cartoons don't come on TV until after school.

This contextual distinction in pupil expectation among second and third graders in Canada in the early 1960's may or may not hold for American high school students today, if the publicly reported chronic and unrelieved complaints of a few high school valedictorians are to be taken as normative–a doubtful conclusion. Nonetheless, McCormack raises the question of student expectation of verity of instructional materials used in the context of the formal school, as opposed to media viewed at home, in the theater, or elsewhere. The expectation of the true as opposed to the make-believe is critical in any "learning" situation.

In-school viewers differed also from at-home viewers in interpretation of program items. For example, in-school viewers speeded up the time required to build an igloo in contrast to at-home viewers who slowed it down. McCormack related this difference in time-work estimate to the regularity and inflexibility of schedule of school activities, and the exhortation in school to complete tasks with minimum delay. At home, the activity pace is more casual and there is more individual freedom to set time limits on activities.

In-school viewers also had more unfavorable attitudes to Eskimos than at-home viewers. The in-school viewers begrudged the physical strength of Eskimos. At-home viewers tended to make more references to concrete images of the Eskimo, including clothing, to interior details, including hides used as blankets, and to their nomadic habits.

On the other hand, in-school viewers were more interested in construction of the igloo and in the technology and economy of Eskimo life.

Among those who viewed the program at home and in school, there was as to be expected a gain in the amount of information recalled, but, interestingly, attention shifted away from igloo construction to objects interior to the igloo. Their references to the harshness of the Arctic environment were muted, and there were fewer references to climate, or pleasures or discomforts of the cold. McCormack interprets this as a "third pattern" of contextually influenced response.

In the last paragraph of her report, McCormack seems hesitant to face up to the full significance of her contextual hypothesis, and closes with the standardized pedagogical admonition that "the criterion for evaluating a school telecast [perhaps a classroom instructional film as well] must reflect the power of television to provide conceptual learning experiences." Here we have the old refrains of "the power of television" and the retreat to the primacy of the cognitive domain in instruction. Even the bravest, it seems, blanch at the thought of ethnic attitudes, physical characteristics of people, and the

importance of concrete images.

However, in this exploratory study, McCormack introduces evidence which clearly suggests that institutional viewing context (in-school, at-home, and both) are important determinants of pupils' expectations, selective perception, and attitudinal dispositions. These, it appears, warrant study in the area of instructional films (and other instructional materials) and study of the desirable and manifest roles of the teacher, as McCormack indeed suggests, in correcting misinformation and influencing the directionability of attitudes.

Color as a New Medium

From the middle 1940's on, evidence began to accrue that color films used for instruction were superior to black and white versions along the memory dimension—what was learned was remembered better. Convincing evidence of the effects of color films on retention was produced by VanderMeer (1952) who had done earlier research on color vs. black and white.

On the basis of earlier studies, Hoban and van Ormer (1950) commented:

> There is some evidence that, under certain conditions, the color medium increases the effectiveness of the visual presentation and, perhaps, reinforces the effect of the picture. By this same line of reasoning, it is conceivable that color may distract attention from other important learning cues, for example, material in the commentary or other visual cues in the picture. In the final analysis, it is probably a question of determining what are the *crucial cues* for learning. If color provides crucial cues in some learning situations, then it should be used. Much research remains to be done in this area.

As late as 1967 and 1968, Kanner continued to report that research here and there provided no evidence that the use of color in pictures or TV resulted in increased "learning" (1967, 1968).

However, from Canada came an entirely new approach to color in TV, which dealt with differential audience responses to color and black and white TV display and, to a degree, shed some light on the inadequacy of prior research on color while totally ignoring the problems of "learning" and remembering (Scanlon, 1967). This study also added an unexpected aura of prophecy to Hoban and van Ormer's casual comments on the possible interfering effect of color on accompanying narration.

Scanlon's study was exploratory, involved only 21 subjects (college students in journalism), who viewed the televised version of the state funeral of the late Governor General of Canada, Georges Philias Vanier. Roughly half viewed the televised funeral coverage in black and white, and the other half in color. Only one set of TV cameras was used, so the same program appeared on both tubes. The viewing was done in the headquarters of the Canadian Broadcasting Company in two separate rooms. The students were told they had to write a report of the funeral. The TV coverage was of two hours duration.

Analysis of the students' reports indicated four differences between those who had viewed the broadcast in color and the others in black and white. Scanlon summarized these as follows:

1) The color group was more aware of color and made twice as many references to color in its reports.

2) The black and white group wrote far longer and far more detailed reports.

3) The black and white group paid far more attention to the commentators and showed a pronounced irritation at some of their observations.

4) The color group appeared to have been more moved by the funeral and its reports contained a good deal more emotional content.

What seems apparent from Scanlon's exploratory study is that response patterns differed markedly and very significantly according to color vs. black and white images on the tube. He entertains the idea that color TV may in fact be a different medium from black and white TV. Another way of saying this is that they are two different "languages," the grammars of which are not as yet known.

Nearly two years after his exploratory study, Scanlon repeated it, but this time the broadcast covered the Grey Cup football match at Toronto (1970). The subjects were also college seniors in journalism—22, divided evenly into two groups, one of which saw the telecast of the game in color and the other in black and white. In contrast to the first study in which no limits were placed on the size of the report, the repeat study population were asked to write only five highlights of the game. They were also told not to bother taking notes, whereas in the first study notetaking was optional.

Three of the four findings of the earlier study were generally confirmed in the analysis of the written reports on the football match. The color group was more aware of color. The reports of the black and white group were longer and more detailed. The black and white group showed some evidence of paying more attention to the commentary but were not critical of the commentator. However, no greater emotional expression was evident in the color than in the black and white group.

In his second report, Scanlon wrote with greater conviction that, in the terminology of Edmund Carpenter, "color television is a new language, its grammar yet unknown."

Scanlon's tentative inferences from his research on color in television are that color creates an awareness in depth and contrast. It leaves different impressions. It absorbs. It may even alter the group relations of those watching it.

The most recent research on color vs. black and white in instructional films and ITV continues the traditional finding of no significant differences in "learning" (Balin *et al.*, 1968).

While there are dangers in going overboard in generalizing from Scanlon's research, his studies indicate that, with color TV, a set of response differences exists under certain conditions. This set of differences has implications for education and classroom instruction. Perhaps in instructional film research we have been looking for response differences in the wrong pews of the wrong church.

Model Nurturance and Audience Response

It is a step back in time from consideration of research on color as a new medium or language with an undefined grammar, to two exploratory investigations done by Hoban nearly twenty years ago on character roles in films as models with whom the audience identifies or finds admirable, tolerable, or obnoxious.

For the most part, this area of research in instructional and training films has been overlooked, possibly because its reinforcing relationship to "learning" has not been in the main stream of either media research or research in educational psychology. Such concepts as "social power," "secondary reinforcement," "status envy" and the like are intrinsic to the "hidden curriculum" (Jackson, 1968b), but as long as this curriculum remains "hidden," it is unlikely to be an apparent object of research which, by its nature, intrudes on the privacy of the classroom and turns on the spotlight where the shades are drawn and the doors closed.

As instructional films depart from their voice-over techniques and present the live-recorded verbal interactions of characters in contextual settings, the problems of casting, direction, acting, and role assume importance beyond cinematic technique to audience response patterns.

In an exploratory study of audience status and aspiration interacting with role characterization of an Army training film (produced in cameo style, without visible

background), Hoban (1953a) found evidence from which he inferred the two following hypotheses:

1) Audience involvement and positive identification reactions to instructional (social reality) films are determined more by audience aspiration than by audience status at the time and under the circumstances of the film-viewing situation.

2) Audience aspiration to model roles presented in instructional films is determined by the ratio of the value of achieving the aspired role to the value of the effort necessary to this achievement, assessed at the time and under the circumstances of the film-viewing situation.

The film dealt with the operation of the newly introduced Army 16 mm sound projector set. Only the trainee was shown with the set. The instructor never appeared in the film—only his off-stage voice was heard in dialogue with the trainee practicing on off-duty time on projector set operation, etc.

The film was shown to two groups: enrollees in three projector operator training programs (N = 45), and a large heterogeneous group of GI's attending a Saturday morning orientation lecture program, from which 43 of their questionnaires were selected for analysis. The research instrument was a questionnaire undergoing pretest for later administration in a planned film effectiveness study. The film treatment was experimental. Incidentally, it was finally given official Army approval only after much discussion and on condition that a line appear on or near the title specifying that the training method shown in the film was not in accord with Army doctrine on training methods.

Included in the questionnaire were eleven adjectival words or phrases, from which eight were selected for analysis. The intent of these adjectives was to provide an index to audience identification with either the trainee or the (expert) instructor. All eight selected descriptions were favorable.

Chi square analysis indicated that the trainees tended to "identify" with the expert model (instructor) and that the general GI orientation lecture attendees tended to identify with the trainee ($p < .0001$). The concept of aspiration was inferred from the nature of the two audiences, and that of "identification" from the number of checks given each of the two film characters on the eight favorable traits.

The hypotheses derived from the data were the opposite of those expected prior to the study. It was expected that those enrolled in the projectionist training course would identify with their peer (the trainee in the film) and that the general GI audience, without commitment to becoming licensed projectionists, would identify with the expert.

Without going into either technique or detail it is noted here that some evidence exists that male high school students tend to identify with their favorite TV characters in terms of their concepts of self as is, rather than self as they would like it to be. Female high school students tend more to identify with favorite TV characters in terms of self as they would like it to be (Groner, 1971).

Hoban's second report covered responses to both the film on the Army 16 mm projector set and to a training film dealing with on-post safety (1953b).

In the film on the projector set, a Voice from the Gallery (off stage) was used as an audience protagonist to raise questions on operation of the set not clearly answered in the preceding explanation. The Voice was surely not that of a valedictorian of any old established Ivy League college, but rather that of a stereotyped Hard Hat. An item in the evaluation instrument dealt with like-dislike of the Voice. Chi square analysis showed an association ($p < .01$) between education and dislike. None of those with grade school education (N = 19) disliked the Voice. Of the high school graduates (N = 65) 12% disliked it, and of the college graduates (N = 36) 41%. A similar relationship was found between education and whether the film was interesting, but no relationship was found between

education and the training ratings of the film.

In the film dealing with on-post safety, rejection of an overtolerant sergeant was found to be related to whether the viewer was an enlisted man or an officer. Of the enlisted men (N = 238), 26% rejected the sergeant by indicating that they would not care to serve with him, and of the commissioned officers (N = 55), 52% so indicated.

The data of these two studies suggest that status, whether of education or military rank, is related to responses to roles portrayed in training films.

If in the area of instructional films such response areas as like-dislike, acceptance-rejection, identification with models, and of role characterization and behavior are to be of concern, it is evident that audience variables and casting, acting, and directing interact. These are in the affective domain and are likely to have at least a secondary relationship to "learning."

It may be noted that throughout this report quotation marks are frequently used in connection with the word *learning*. This is because learning means a change in habit pattern in response to environmental forces, whereas in the instructional research literature it generally refers to gains in test scores over time. This latter operational definition of "learning" is treated with reserve in this paper since it is a function of the existing technology of educational "measurement."

Emotional Responses

Emotional arousal and its relation to attitude formation and "learning" from sound motion pictures (movement) and sound filmstrips was investigated by Miller (1967). Previously, Case and Levonian (1962) had satisfied themselves that the galvanic skin response (GSR) was a satisfactory index to physiological responses to films under classroom conditions. While the usual outcome of no significant differences in "learning" between motion pictures and filmstrips was conscientiously reported by Miller, he also found that the motion picture group scored significantly higher on attitudinal evaluation of the motion picture but not on emotional response as "measured" by the GSR.

In the field of emotional responses to instructional films we are still on the informational level of the stone age in research, despite our research technology. Reasons may be that we are not asking the right questions, or not using films that are emotional in tone, or not clever enough in the design of instruments "measuring" information, attitudes, and the relation of attitudes to visceral activity.

Media Men: Some of the Attributes

In a self-administering questionnaire survey of subscribers to four journals dealing with the area of communication, including *AV Communication Review*, Hoban obtained information on some of the attributes of media men. The assumption is made here that subscribers to *AVCR* are, by and large, media men engaged in media research, in teaching, and in administration of instructional materials services in schools, colleges, churches, industry, and military services (1967). The further assumption is that the replying sample of 471, taken collectively, is reasonably representative of the general population of media men—at least of those interested enough to subscribe to the field's prestige scholarly journal. (Some data are included here which were not reported in the final report because of the principal investigator's difficulty in dealing with what he considered to be stupid directives on how a report must be written.)

One of the outstanding characteristics of media men is that they are overwhelmingly men, not women. Only 11% of the responding sample were women.

Their chief interests are, as might be expected, in educational media (83%), with

general education a secondary consideration (60%), and psychology (16%) and sociology (4%) of only slight concern.

A plurality (40%) are employed by colleges and universities, and 37% by school systems. The remaining fourth were scattered largely in government and commerce.

Two-thirds of the media men spend most of their time in administration, with less than a third devoting most of their time to teaching and only 13% to research.

Less than half (47%) are engaged in any kind of scholarly activity–research, writing position papers or articles on this or that, or preparing papers for policy decision. Turning this around, nearly half the media men are engaged in scholarly activity–a fact of a sort which is ordinarily either not known, or, if known, ignored.

The two journals media men consider professionally most significant are, in order: *Audiovisual Instruction* (57%) and *AV Communication Review* (45%). No other journal is considered among the most significant by more than 18%. The percent listing *AVCR* as one of their most significant professional journals coincides almost exactly with the percent engaged in scholarly activity. For the remainder, it appears to be something you leave on the desk in a prominent position, and perhaps scan for information of possible interest.

Media men complain that the journals considered professionally most significant contain too many insignificant articles (47%) and are overly technical (39%). The complaint on insignificant articles is greater among media men than among subscribers to any of the other three journals surveyed.

In value structure, **enlightenment**, **rectitude**, and **skill** are in high priority among media men. **Skill**, **affection**, and **well-being** are of second priority. **Respect** is of third priority, and **power** and **wealth** are respectively fourth and fifth.

Over half (56%) of the media men have earned Master's degrees and a fourth (26%) have earned their doctorates.

About two-thirds (65%) are between 31 and 50 years old, and a quarter are over 50. Only about 10% are below 30. Media men are, in age, not exactly young Turks, but neither are they tired old men (only 6% are over 60).

On the whole, then, media men are middle-aged, and four out of five have earned graduate degrees. The majority divide almost equally between colleges and school systems as employing institutions. Their jobs, for the most part, involve administration much more than teaching. Respect (status) is not high on the list of value priorities, so if they are low on the campus totem pole it may be, among other things, because they don't very much care.

Their scholarship, judged by articles published during the past three years, is a little below average in quantity, but four out of ten have published at least one article during that period.

Their professional interests tend to be limited, to concentrate on the field of media and the general field of education.

From this sort of a statistical profile, it seems unreasonable to expect great forward leaps from the media men, or strong rapport with relevant aspects of the disciplines of psychology or sociology, unless media men confront the difficult problems of self-renewal.

The writer of this paper attended the 1971 convention in Philadelphia of the renamed Association for Educational Communication and Technology. He sensed an overwhelming state of uncertainty and confusion concerning the future role of media man. There may be two reasons for this: (1) American education is in this same general state, and (2) the direction of future growth probably lies in substantive as well as media concerns, an openness to "outside" ideas, and a willingness and ability to participate in instructional design on several levels.

SUMMARY

In summary, it can be said that the boundaries of knowledge and performance capabilities of instructional films are extending outward, but largely in directions that are somewhat neglected in the professional literature. The use of instructional films is expanding rapidly in volume, miniaturization of film and projection equipment has been developed, functions of films in instruction are being redefined, theoretical foundations are emerging in promising directions, research is advancing at a snail's pace in directions other than classical learning, logistical organization of film supply is being decentralized, and "media man" is in a transitional stage.

EPILOGUE

One completes a paper such as this with two reactions. The one deals with whether, in the final analysis, the really important topics were covered, and, if so, with fairness, accuracy, and a balance between brevity and sufficiency. The other reaction relates to the mystique of American education and whether, perhaps, we have drifted away from its majestic essence and fundamental simplicity.

Early in May, 1971, James Reston visited the campus of Ohio University at Athens, Ohio. On the Class Gateway of the first college in the Northwest Territory he found this quotation from the Ordinance of 1787: "Religion, morality and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged" (Reston, 1971).

Nobody with good sense would say that living according to a religion demanding faith and self-giving, or internalizing moral norms, or acquiring knowledge is easy, or even that there is general consensus on just what constitutes each of these virtues.

However, it would be refreshing if our schools and the means of education were reviewed in terms of the deep significance and broad implications of the Ordinance of 1787. The Founding Fathers may have been right after all. Reston observed that many of the people who vote against school bond issues, but who support the schools and colleges through their taxes, continue to believe as did the Founding Fathers.

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